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By: Nancy Amacker

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)	Examiner: A. Oberley
THOMAS G. ZIMMERMAN, et al.)	Art Unit No. 266
Serial No. 07/317,107)	
Filed: February 28, 1989)	DECLARATION OF THOMAS G. <u>ZIMMERMAN AND JARON LANIER</u>
For: COMPUTER DATA ENTRY)	
AND MANIPULATION APPARATUS)	
AND METHOD)	

Hon. Commissioner of Patents and Trademarks

Washington, D. C. 20231

Sir:

The undersigned, Thomas G. Zimmerman and Jaron Lanier, hereby declare that:

1. We are the joint inventors of the subject matter disclosed and claimed in U.S. Patent application No. 07/317,107, which is a continuation of U.S. Patent application No. 07/026,930, now abandoned.

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2. The subject matter of the above patent application was reduced to practice at least as of June 1986 as evidenced by the following facts.

3. On or about June 1 - 5, 1986, inventor Jaron Lanier attended The Consumer Electronics Show (CES) in Chicago, Illinois.

4. At the CES, Jaron Lanier made working demonstrations of an apparatus which incorporated the subject matter claimed in the above patent application.

5. The apparatus included a glove adapted to be worn on the hand of a user. The glove had sensors attached to the fabric. The sensors were of the type which provide signals which indicate the continuous extent of bending of the user's fingers.

6. The glove also included two ultrasonic transmitters which emitted signals at ultrasonic frequencies.

7. The apparatus further included a computer and display which had three ultrasonic receivers disposed about the display for receiving the signals emitted from the ultrasonic transmitters.

8. The computer was also coupled to receive the signals from the sensors.

9. The computer included a program which processed the signals received by the ultrasonic receivers to determine the position and orientation of the glove with respect to the

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display. The program also determined the extent of bending of the parts of the user's hand, especially the fingers.

10. The computer program also displayed on the computer display a virtual hand which emulated the position and orientation of the user's hand with respect to the display together with the extent of bending of the users fingers.

11. The computer program also displayed on the computer display a virtual object which could interact with the virtual hand.

12. In one demonstration, a user wore the glove and caused the virtual hand to manipulate a virtual ball. The virtual hand was used to pick up the ball and throw it at virtual targets.

13. In another demonstration, the user could play a game entitled "scissors, paper, stone" with a humanoid mouse figure displayed on the computer display. In this game, the user began by clenching his or her fist. The mouse then began counting to three. On the third count, the user made a hand gesture which represented one of a scissors, paper, or stone. The mouse would do the same. The goal was to match the mouse's gesture.

14. In another demonstration, the user could create a finger painting on the computer display. The user could change the color of the paint and create sound effects by appropriate hand gestures. The user could also cause virtual objects (e.g.,

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cubes, etc.) to emanate from the virtual hand based on gestures of the hand.

We further declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: 19 December 1989 

THOMAS G. ZIMMERMAN

Dated: _____

JARON LANIER

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